

REMARKS / ARGUMENTS

This Reply is submitted in response to the non-final Office Action mailed May 7, 2008. The deadline for responding has been extended to September 8, 2008 by a request for an extension of time made herewith.

I. Introduction

Claims 26-66 are pending in the application.
Claims 26-66 are rejected.

As will be discussed below, all of the claims are definite and none of the pending claims are anticipated or rendered obvious by the applied references.

Each of the rejections, is based on an Examiner proposed combination of several references. **Each of the rejections relies on the use of EP 0933897 (the Dagdeviren reference) and U.S. Patent No. 7,110387 to Kim et al. (the Kim et al. patent).**

As will be discussed below, the Examiner's rejections are based on an apparent miss-interpretation of one or more of the applied references and none of the pending claims are anticipated or rendered obvious by any of the applied references whether considered alone or in combination.

II. The Rejections under §103

1. Detailed discussion of the Rejection of Claims 26-36 and Why the Rejections Should be Withdrawn

Independent claim 26 is patentable because it recites, among other things, the features indicated in bold below.

A method of making symbol timing adjustments in a communications device including a transmitter which transmits multiple symbols in each of a plurality of dwells, the method comprising the step of:

determining the number of samples by which the symbol timing is to be advanced or delayed during a dwell;

increasing the number of samples in one of a first symbol and a last symbol of said dwell by the determined number of samples when said symbol timing is to be delayed during said dwell by the determined number of samples; and

decreasing the number of samples in one of the first symbol and the last symbol of said dwell by the determined number of samples when said symbol timing is to be advanced during said dwell by the determined number of samples.

In rejecting the claims, the Examiner cites various references and asserts that they would be obvious to combine in the manner suggested by the Examiner. However, it is respectfully submitted that the combination is not obvious since it would interfere with the proper operation of the system in the primary reference, the Dagdeviren reference, and further that the rejection is based on a miss-interpretation of one or more of the references as will be discussed below. Furthermore, it appears that even if combined in the manner suggested by the Examiner, they would not result in the claimed subject matter.

Without going into all the deficiencies in the rejection, Applicant will address at least some of them

to make it clear that the applied references do not anticipate or render the pending claims obvious.

In the rejection the Examiner states:

In regard to claim 26, Dagdeviren discloses a method of making symbol timing adjustments in a communications device including a transmitter which transmits multiple symbols, the method comprising the step of: determining the length by which the symbol timing is to be delayed (paragraph 24 lines 34 and 35 disclose **delaying the symbol timing by increasing the size of the cyclic extension**); increasing the number of samples in one of a first symbol and a last symbol by the determined number of samples in one of a first symbol and a last symbol ... Dagdeviren does not disclose the length of the delay is equal to a number of samples. **Dagdeviren also does not disclose wherein the symbol to be delayed in one of a plurality of symbols making up a dwell.**

Spruyt discloses adding samples (not symbols) in column 2, lines 28-31. **Kim discloses timing alignment by adding samples to the first symbol in figure 5 (*The dwell is referred to as a data symbol, but it is composed of 4 data symbols, each of which is composed of N samples, therefore satisfying the definition of a dwell.*)**

It would have been obvious to one of ordinary skill in the art at the time of the invention to perform the timing alignment of Dagdeviren and Spruyt **on one symbol in a dwell as opposed to every symbol in a dwell**, as taught by Kim in column 2, lines 59 - column 3, line 2 and column 4, lines 14-36. (bold, Italics and underlining added)

Applicants will now address at least some of the deficiencies in the Examiner's argument. The rejection is based on three references. In the rejection the

Examiner's remarks do not closely track the claim language making it difficult sometimes to determine precisely which element of claim the Examiner thinks the reference discloses or suggests. Applicants will attempt to address the references in the order they are applied to claim 26. Since many of the same references are applied to other claims as well, it should be appreciated that many of the comments are applicable to the Examiner's application of the references to other claims as well.

A) The Dagdeviren Reference and the Examiner's proposed modifications thereto are not obvious, would interfere with the operation of the Dagdeviren system and fail to appreciate the references Teaching Away from the claimed subject matter

The Examiner asserts:

It would have been obvious to one of ordinary skill in the art at the time of the invention to perform the timing alignment of Dagdeviren ... on one symbol in a dwell as opposed to every symbol in a dwell ...

In the above statement the Examiner asserts it would be obvious "**to perform the timing alignment of Dagdeviren ... on one symbol in a dwell as opposed to every symbol in a dwell**".

It is respectfully submitted that the Dagdeviren reference, is directed to a very different problem and results in a solution which is very different from, **and actually teaches away from**, the claimed subject matter. The term dwell does not appear in the reference. As will be discussed below, the reference teaches that the length of **each symbol in a communications period should**

be increased as a function of a propagation delay measured during a training phase. In the cited reference in order to achieve the benefit of interference reduction being sought, **the cyclic length of each symbol is increased** at both the uplink transmitter and downlink transmitter so that the uplink and downlink symbol streams can be synchronized to be within the length of the cyclic extension.

This is in sharp contrast to:

... **increasing the number of samples in one of a first symbol and a last symbol of said dwell by the determined number of samples when said symbol timing is to be delayed** during said dwell by the determined number of samples; and
decreasing the number of samples in one of the first symbol and the last symbol of said dwell by the determined number of samples when said symbol timing is to be advanced during said dwell by the determined number of samples

which is what is recited in pending claim 26.

In the **Dagdeviren** reference, the interference benefits and synchronization being sought by the reference would not be achieved if different cyclic extensions were used for different symbols. Accordingly, one reading the reference would conclude that it actually teaches away from the subject matter recited in many of the pending claims.

Applicants will now address the Dagdeviren reference in further detail.

The Dagdeviren reference is directed to a system in which an Asymmetric Digital Subscriber

Loop (ADSL) Discrete Multi-Tone system is used which **has disjoint and adjacent upstream and downstream channels where interference may occur between different carriers of the upstream channel and the downstream channel.** (See Summary of the Invention, Col. 2, lines 21-31 and Figure 3) As discussed in R1, an ADSL transmitter is synchronized with a far-end ADSL transmitter to reduce interference. (See Col. 6, lines 24-31)

To address the interference problem, the system described in the Dagdeviren reference uses a training phase of an ADSL connection during which a propagation delay is determined. The training phase is followed by a communications phase wherein each of the uplink and downlink transmitters synchronize transmission of DMT symbols to a reference clock. Along with synchronization to a reference clock, the cyclic extensions of each DMT symbol is increased as a function of the propagation delay. (See col. 7, lines 44-61). It is by increasing the cyclic extension of each symbol along with synchronization to a reference clock that the desired result is achieved. (See Figures 8-10)

It should be appreciated from a review of Figures 8-10 of the applied reference and the corresponding discussion, that each symbol has the same size cyclic extension and that this is important in the Dagdeviren reference to provide interference control.

Thus, **it should be appreciated that in the Dagdeviren reference, the determination and**

adjustment of the cyclic extension size is NOT used for advancing or delaying symbol timing in a dwell but rather simply to make sure that for a given propagation delay, a sufficiently long cyclic extension is used to allow synchronization between upstream and downstream symbol streams to within the cyclic extension length. Furthermore, simply adjusting one symbol in the Dagdeviren reference as the Examiner suggests would create interference problems and interfere with the operation of the Dagdeviren reference. Accordingly, one reading the reference would not be motivated to modify the Dagdeviren reference in the manner suggested by the Examiner nor would one of ordinary skill in the art see it as advantageous to do so.

In view of the above discussion, it should be appreciated that all of the rejections, each of which is based on use of the Dagdeviren reference should be withdrawn since the reference does not render obvious the Examiner's suggested combination whether considered alone or in combination.

It should be noted that since the Dagdeviren reference does not address dwells, it also fails to teach disclose or suggest:

determining the number of samples by which the symbol timing is to be advanced or delayed during a dwell.

Accordingly, the rejection of claim 26 should be withdrawn for multiple reasons.

B) The Spruyt et al. Reference

**Spruyt et al. EP 0820171 Also
Teaches Away from the
Examiner's proposed combination**

The above discussion of the Dagdeviren reference failed to address the Examiner's assertions regarding the Spruyt et al. reference. In the Office Action the Examiner stated:

It would have been obvious to one of ordinary skill in the art at the time of the invention to perform the timing alignment of Dagdeviren and Spruyt on one symbol in a dwell as opposed to every symbol in a dwell ...

A little further down in the rejection the Examiner further states:

Spruyt discloses adding samples (not symbols) in column 2, lines 28-31.
(Office action page 3)

Notably while column 2, lines 28-31 discuss making a transmission timing adjustment the Examiner fails to discuss or appreciate that the very next few lines of the paragraph which make it clear that the adjustment is not to just one symbol **but is performed for successive transmit data symbols.**

In particular, a more complete quote of column 2, i.e., lines 25-37 state:

In this way, by rotating the phase of the carriers whereon digital transmit data is modulated in proportion to their respective carrier frequencies, and by duplicating or deleting samples in the transmit data symbols, these symbols are shifted forward or backward in time. Thus, boundaries of receive data symbols can be aligned. The phase rotation

applied to the transmit data symbols will increase or decrease gradually for successive transmit data symbols since the misalignment between transmit data symbols and received data symbols changes gradually due to a clock speed difference ... This rotation is compensated for by the transmit rotation means. (Col 2, lines 25-42, bold added)

It should be appreciated that the Spruyt patent teaches away from the claimed subject matter *by describing the application of phase rotation to successive transmit data symbols*. Furthermore, it should be appreciated that the reference lacks any discussion of a dwell.

It should be noted that since the Spruyt reference, like the Dagdevien reference, also does not address dwells, it also fails to teach disclose or suggest:

determining the number of samples by which the symbol timing is **to be advanced or delayed *during a dwell***.

Accordingly, the rejection of claim 26 should be withdrawn for multiple reasons.

C) The Kim et al. Patent

In the above remarks Applicants have established that the Dagdeviren and Spruyt patents teach changes being applied to successive symbols thereby teaching away from the claimed dwell based features of:

determining the number of samples by which the symbol timing is to be advanced or delayed *during a dwell*;

increasing the number of samples in one of a first symbol and a last symbol of said dwell by the determined number of samples when said symbol timing is to be delayed during said dwell by the determined number of samples; and

decreasing the number of samples in one of the first symbol and the last symbol of said dwell by the determined number of samples when said symbol timing is to be advanced during said dwell by the determined number of samples

The last reference cited by the Examiner in rejecting claim 26 is the Kim et al. patent.

With regard to the Kim et al. patent the Examiner states:

Kim discloses timing alignment by adding samples to the first symbol in a dwell in figure 5. (**The dwell is referred to as a data symbol, but it is composed of 4 data symbols, each of which is composed of N samples, therefor satisfying the definition of a dwell**)

The Examiner's comments show some confusion about the reference but even if taken as true do not anticipate or render obvious the claimed subject matter. It seems that the Examiner is interpreting a single OFDM **DATA symbol** used to communicate multiple data and/or pilot values as a DWELL. As should be appreciated, a single OFDM symbol may communicate multiple values, e.g., corresponding to a separate tone. In some cases some of the tones are used to transmit pilot values in an OFDM system. However, the different values of an OFDM symbol are all transmitted in parallel and therefor have the same duration. **The Examiner seems to be attempting to argue that it would be obvious to alter the transmission time of a first**

value communicated in a OFDM symbol "one of a first and last symbol in a dwell" without changing the amount of time used to transmit the other values in the OFDM symbol. This ignores the reality that an OFDM symbol, is a single unit having a single transmission time.

The Examiner's confusion seems to stem from various processing stages in the applied reference where pilot values are inserted and removed from a stream of information being communicated. While the values are processed serially in some places in the system, **groups of values are transmitted in parallel in what the Examiner refers to as a DATA Symbol.** The problem with the Examiner's analysis however is that multiple values, whether they be data or pilot values each has the same number of N bits with multiple N bit units being transmitted in a single OFDM DATA symbol over the air. Note that each individual symbol e.g., pilot or data, included in a transmitted DATA symbol **includes the same number of samples** in the Kim patent.

It would not be obvious to alter the duration of the pilot symbol shown in Figure 5 to be different from that of the individual data symbols since **they are being transmitted in parallel** as part of an OFDM symbol.

Given the Examiner's interpretation of a DWELL in the Kim patent as being an DATA symbol which includes multiple individual symbols transmitted in parallel, e.g., on different tones, **there is no reason to have one of the parallel values (individual tone signals) have a duration longer than the others in the parallel transmission unit.**

In view of the above discussion, it should be appreciated that none of the references discuss or suggest the features of claim 26 or come anywhere close to suggesting what is claimed. Accordingly, the rejection of claim 26 and all the other claims which are based on similar reasoning should be withdrawn.

**2. The Rejection of Claims 37-63
 Should be Withdrawn**

The Examiner's rejection of claims 37-63 each depend on one or more of the references discussed above being applied to these additional claims in the same or similar manner to the way in which they were applied to claim 26.

Accordingly, **claims 37-63 are patentable over the applied references for the same or similar reasons that claim 26 is patentable.**

For example, claim 37 is patentable because it recites:

A method for adjusting symbol timing in a first communications device in an Orthogonal Frequency Division Multiplexing system, the method comprising:

 determining a receiver symbol timing adjustment to be made to adjust receiver symbol timing in said first communications device to synchronize receiver symbol timing to the symbol timing of a second communications device; and

 adjusting the symbol timing of a transmitter in said first communications device as a function of said determined receiver symbol timing adjustment,

said step of adjusting the symbol timing of the transmitter including **selecting one of a first and a last symbol in a dwell to be modified to adjust the transmitter symbol timing, said dwell being a period of time comprising multiple symbol times during which a tone or set of tones is used by the first communications device prior to switching to another tone or set of tones.**

With regard to claim 37, it is respectfully submitted that the applied references do not disclose, among other things, the recited features indicated in bold.

The Examiner recognizes that the primary reference used against claim 37, Knutson US 6,563,862 and the secondary Dagdevrin reference discussed above do not disclose the feature indicated in bold. However, the Examiner goes on to assert that the Kim patent discloses the feature. As discussed above this is clearly not the case. The Examiner states regarding Kim:

The dwell is referred to as **a data symbol, but it composed of 4 data symbols**, each of which is composed of N samples, therefore satisfying the definition of a dwell.

It should be appreciated that the DATA symbol transmitted in Kim has a duration of a single symbol time **NOT multiple symbol times**. The mere fact that multiple individual symbols may be communicated in parallel using a single OFDM DATA symbol does not mean that it requires multiple symbol transmission times to transmit the DATA symbol.

Accordingly, it is clear that the DATA symbol cited by the Examiner in Kim **does NOT satisfy the language of claim 37 regarding a dwell.** In particular, the following language of claim 37 is not satisfied by the DATA symbol of Kim:

said dwell *being a period of time comprising multiple symbol times* during which a tone or set of tones is used by the first communications device prior to switching to another tone or set of tones
(italics and underlining added for emphasis).

3. The Rejection of the Remaining claims Should be Withdrawn

Each of the remaining claims is patentable over the applied references for the same or similar reasons that claims 26 and 37 are patentable. Accordingly, it is requested that the rejection of all the pending claims be withdrawn.

III. Conclusion

In view of the foregoing amendments and remarks, it is respectfully submitted that the pending claims are in condition for allowance. Accordingly, it is requested that the Examiner pass this application to issue.

To the extent necessary, a petition for extension of time under 37 C.F.R. 1.136 is hereby made and any required fee in regard to the extension or **any other fee due in regard to this amendment is authorized to be charged to the deposit account of Straub & Pokotylo, deposit account number 50-1049.**

None of the statements or discussion made herein are intended to be an admission that any of the applied references are prior art to the present application and Applicants preserve the right to establish that one or more of the applied references are not prior art.

Respectfully submitted,

September 8, 2008 /Michael P. STRAUB, Reg. #36,941/
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